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(54) **DRILL WITH REMOTELY CONTROLLED OPERATING MODES AND SYSTEM AND METHOD FOR PROVIDING THE SAME**

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This patent is subject to a terminal disclaimer.

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(58) **Field of Classification Search**

USPC 175/11, 79, 62; 251/297

See application file for complete search history.

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(57) **ABSTRACT**

The present invention relates to a drilling system with a multi-function drill head used in, among other applications, oil and gas drilling. The system is used to enhance the effective permeability of an oil and/or gas reservoir by drilling or cutting new structures into the reservoir. The system is capable of cutting straight bores, radius bores, or side panels, by water jets alone or in combination with lasers. In various embodiments, a device for remotely controlling the mode of the system by variations in the pressure of a drilling fluid is also provided, allowing an operator to switch between various modes (straight drilling, radius bore drilling, panel cutting, etc.) without withdrawing the drill string from underground.

10 Claims, 25 Drawing Sheets